

REMARKS

The Applicants thank the Examiner for the careful examination of this application and respectfully request the entry of the amendments indicated hereinabove.

Claims 74-76 and 80-97 are pending and rejected. Claims 74-76 are amended hereinabove.

Independent Claim 74 positively recites a haze free PZT film prepared in accordance with the claimed method. These advantageously claimed features are not taught or suggested by the patent granted to Basceri et al., Gilbert et al., or Sakurai; either alone or in combination.

Basceri et al. does not teach the advantageously claimed invention because Basceri et al. does not teach the formation of a haze free PZT film. Basceri et al.'s PZT film is not haze free because it is formed with precursors flowing (column 6 lines 54-55, column 8 line 43). The Applicants form the haze free film with a method that involves preheating the wafer in an inert atmosphere. Moreover, the Applicants note that PbO is a volatile compound that makes processing of PZT much different than the processing methods taught by Basceri et al., which is directed mainly toward the processing of BST (bulk and interfacial) layers.

The Applicants note that the "gasses" cited in the Office Action (page 2) are carrier gasses (column 8 lines 48-50) and not the chamber gases of the Applicants' invention (again, the Applicants are not flowing any precursors during the pre-deposition step of preheating the wafer).

Gilbert et al. does not teach the advantageously claimed invention because Gilbert et al. does not teach the formation of a haze free PZT film. In addition, Gilbert et al. teaches away from the claimed invention because Gilbert et al. requires that the wafer be suspended by lift pins over "susceptor 24" (column 6 lines 55-67); but not on the heater as advantageously claimed.

Regarding Claim 83, the Applicants respectfully traverse the statement in the Office Action (page 7) "that Applicant does not teach that the Ar flow rate of at least 20% solves any stated problem or is for any particular purpose" and that "the flow rate lacks criticality in the claims invention and do not produce unexpected or novel results." The Applicants submit that they clearly state on page 5 (lines 15-17) that "[b]ecause of the preheat step that was performed in accordance with the invention hereinabove, a haze free, phase pure PZT film is now formed..." In addition, the Applicants clearly state on page 6 (lines 16-20): "By performing the preheat step in accordance with the present invention, the stoichiometric PZT from that forms the capacitor dielectric, 3, has desirable endurance, durability, and reliability.

Furthermore, the haze free, phase pure PZT film, 3, formed using the preheat step of the present invention will operate at a lower operating voltage and therefore reduce the power consumption of the electronic device.

Sakurai et al. does not teach the advantageously claimed invention because Sakurai et al. does not teach the formation of a haze free PZT film. Sakurai et al.'s PZT film is not haze free because Sakurai et al.'s fabrication process does not include a pre-deposition step of preheating the wafer (column 5 lines 39-44, column 7 lines 44-47), as advantageously claimed. Unlike Sakurai et al., the Applicants form the haze free film with a method that involves preheating the wafer in an inert atmosphere. Moreover, it would not be logical to combine the teachings of Gilbert et al. with Sakurai (Office Action, page 8) because Sakurai's method does not include a preheat step.

Regarding Claim 86, the Applicants respectfully traverse the statement in the Office Action (page 8) that "Sakurai discloses the method wherein the PZT film is doped up to 5% with either La or Nb (see column 4, lines 10-20)". The Applicants submit that Nb is not mentioned anywhere in column 5 lines 10-20. In addition, doping up to 5% isn't mentioned anywhere in column 5 lines 10-20.

Therefore, the Applicants respectfully traverse the Examiner's rejection of Claim 74 and respectfully assert that Claim 74 is patentable over Basceri et al.,

Gilbert et al., and Sakurai; either alone or in combination. Furthermore, Claims 80-86 are allowable for depending on allowable independent claim 74 and, in combination, including limitations not taught or described in the references of record.

Independent Claim 75 positively recites a haze free PZT film prepared in accordance with the claimed method. These advantageously claimed features are not taught or suggested by the patent granted to Basceri et al., Gilbert et al., or Sakurai; either alone or in combination.

Basceri et al. does not teach the advantageously claimed invention because Basceri et al. does not teach the formation of a haze free PZT film. Basceri et al.'s PZT film is not haze free because it is formed with precursors flowing (column 6 lines 54-55, column 8 line 43). The Applicants form the haze free film with a method that involves preheating the wafer in an inert atmosphere. Moreover, the Applicants note that PbO is a volatile compound that makes processing of PZT much different than the processing methods taught by Basceri et al., which is directed mainly toward the processing of BST (bulk and interfacial) layers.

The Applicants note that the "gasses" cited in the Office Action (page 2) are carrier gasses (column 8 lines 48-50) and not the chamber gases of the Applicants'

invention (again, the Applicants are not flowing any precursors during the pre-deposition step of preheating the wafer).

Gilbert et al. does not teach the advantageously claimed invention because Gilbert et al. does not teach the formation of a haze free PZT film. In addition, Gilbert et al. teaches away from the claimed invention because Gilbert et al. requires that the wafer be suspended by lift pins over "susceptor 24" (column 6 lines 55-67); but not on the heater as advantageously claimed.

Sakurai et al. does not teach the advantageously claimed invention because Sakurai et al. does not teach the formation of a haze free PZT film. Sakurai et al.'s PZT film is not haze free because Sakurai et al.'s fabrication process does not include a pre-deposition step of preheating the wafer (column 5 lines 39-44, column 7 lines 44-47), as advantageously claimed. Unlike Sakurai et al., the Applicants form the haze free film with a method that involves preheating the wafer in an inert atmosphere. Moreover, it would not be logical to combine the teachings of Gilbert et al. with Sakurai (Office Action page 8) because Sakurai's method does not include a preheat step.

Regarding Claim 92, the Applicants respectfully traverse the statement in the Office Action (page 8) that "Sakurai discloses the method wherein the PZT film is doped up to 5% with either La or Nb (see column 4, lines 10-20)". The Applicants

submit that Nb is not mentioned anywhere in column 5 lines 10-20. In addition, doping up to 5% isn't mentioned anywhere in column 5 lines 10-20.

Therefore, the Applicants respectfully traverse the Examiner's rejection of Claim 75 and respectfully assert that Claim 75 is patentable over Basceri et al., Gilbert et al., and Sakurai; either alone or in combination. Furthermore, Claims 87-93 are allowable for depending on allowable independent claim 75 and, in combination, including limitations not taught or described in the references of record.

Independent Claim 76 positively recites a haze free PZT film prepared in accordance with the claimed method. These advantageously claimed features are not taught or suggested by the patent granted to Basceri et al., Gilbert et al., Sakurai, or Isobe et al.; either alone or in combination.

Basceri et al. does not teach the advantageously claimed invention because Basceri et al. does not teach the formation of a haze free PZT film. Basceri et al.'s PZT film is not haze free because it is formed with precursors flowing (column 6 lines 54-55, column 8 line 43). The Applicants form the haze free film with a method that involves preheating the wafer in an inert atmosphere. Moreover, the Applicants note that PbO is a volatile compound that makes processing of PZT much different

than the processing methods taught by Basceri et al., which is directed mainly toward the processing of BST (bulk and interfacial) layers.

The Applicants note that the "gasses" cited in the Office Action (page 2) are carrier gasses (column 8 lines 48-50) and not the chamber gases of the Applicants' invention (again, the Applicants are not flowing any precursors during the pre-deposition step of preheating the wafer).

Gilbert et al. does not teach the advantageously claimed invention because Gilbert et al. does not teach the formation of a haze free PZT film. In addition, Gilbert et al. teaches away from the claimed invention because Gilbert et al. requires that the wafer be suspended by lift pins over "susceptor 24" (column 6 lines 55-67); but not on the heater as advantageously claimed.

Sakurai et al. does not teach the advantageously claimed invention because Sakurai et al. does not teach the formation of a haze free PZT film. Sakurai et al.'s PZT film is not haze free because Sakurai et al.'s fabrication process does not include a pre-deposition step of preheating the wafer (column 5 lines 39-44, column 7 lines 44-47), as advantageously claimed. Unlike Sakurai et al., the Applicants form the haze free film with a method that involves preheating the wafer in an inert atmosphere. Moreover, it would not be logical to combine the teachings of Gilbert

et al. with Sakurai (Office Action, page 10) because Sakurai's method does not include a preheat step.

The Applicants respectfully traverse the statement in the Office Action (page 8) that Sakurai teaches "preheating said semiconductor wafer (column 7 lines 40-45), wherein said preheating step comprises heating said semiconductor wafer in a vacuum (see column 7 lines 40-45)." The Applicants submit that in column 7 lines 40-45 Sakurai describes the formation of the platinum bottom electrode, not a PZT film formed over the bottom electrode. Furthermore, no preheating step is discussed in that portion or any other portion of the Sakurai patent.

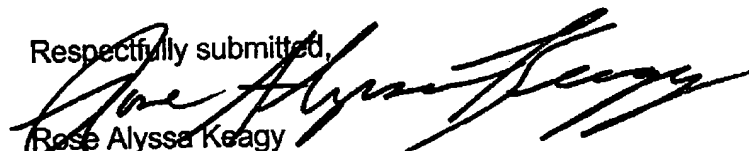
Isobe et al. does not teach the advantageously claimed invention because Isobe et al. does not teach the formation of a haze free PZT film. Isobe et al. (like Sakurai) does not teach the use of a preheating step as advantageously claimed (column 3 lines 49-61, column 5 lines 7-13). Therefore, combining Sakurai with Isobe et al. does not render obvious the advantageously claimed preheating step. In addition, it would not be logical to combine the teachings of Sakurai with Isobe et al. (which is suggested in the Office Action, pages 9 and 10) because Isobe et al. does not teach the use of PZT as the capacitor dielectric. Combining the method of making a Bi-based layer-structural perovskite type ferroelectric material (Isobe et al.) with a method of making a PZT-based ferroelectric material (Sakurai) is not logical.

Regarding Claim 96, the Applicants respectfully traverse the statement in the Office Action (page 10) that "Sakurai discloses the method wherein the PZT film is doped up to 5% with either La or Nb (see column 4, lines 10-20)". The Applicants submit that Nb is not mentioned anywhere in column 5 lines 10-20. In addition, doping up to 5% isn't mentioned anywhere in column 5 lines 10-20.

Therefore, the Applicants respectfully traverse the Examiner's rejection of Claim 76 and respectfully assert that Claim 76 is patentable over Basceri et al., Gilbert et al., Sakurai, and Isobe et al.; either alone or in combination. Furthermore, Claims 94-97 are allowable for depending on allowable independent claim 76 and, in combination, including limitations not taught or described in the references of record.

For the reasons stated above, this application is believed to be in condition for allowance. Reexamination and reconsideration is respectfully requested.

Respectfully submitted,


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